

Editorial

Sputnik and Human Organization

As we write, Sputnik II is still orbiting our earth. By the time this appears in print—who knows?

Meanwhile, the national soul searching goes on. People are asking, "Who is to blame?" and, more constructively, "How did they get ahead of us?" and "What can we do to regain our scientific position?"

We are moved to join in the argument because we fear that, in the emergency drive to support research and development in the natural sciences, the sciences bearing on human organization may get lost in the shuffle. Furthermore, we believe that such an outcome may well have adverse effects even upon our efforts in the natural sciences.

We are inclined to agree that high school education is unduly soft in mathematics and the natural sciences. But let us not assume that this is so because the schools have been concentrating on the humanities and the social sciences.

We shall let the humanists speak for themselves. In the social sciences, high schools do offer work in what are called social studies, but just how solid are the requirements? In the area where the editor lives, these courses are known to the students as "social slop." The opinion seems to be that good grades here can be got through a glib tongue, an average facility with the written word—and very little work.

If we only strengthen secondary education in mathematics and the natural sciences, we shall create a situation where all of the ablest students, who are looking for a real challenge in education, will go into those fields. The social sciences will then be left with the well-meaning mediocrities.

Such a lopsided outcome can hardly be accepted in a democratic society. Furthermore, it would actually handicap us in our competition with Russia.

A large complex society does not advance simply through the talents and efforts of its individual members. Those talents and efforts can be stifled or stimulated according to the nature of the human organization in which the members work.

Research has amply demonstrated that the productivity of workers depends in part upon the pattern of human relations existing in their work places. Research on factors affecting the productivity of scientists and engineers is only beginning to be done, and yet it is already clear that the impact of the organizational environment on their performance is even greater than it is at the worker level. Our missile and satellite programs cannot be substantially accelerated simply by pouring in more money and putting more men on the job. Wherever scientists gather to talk about their problems in research and development, they always come up with the thought that a great part of the difficulties lie in "psychological factors"—by which they mean factors affecting the recruiting of able people and the building of an effective human organization. Whether they talk of top level inter-service rivalry or the more mundane obstacles that face the research worker in his day-to-day effort, they are constantly grappling with problems of human organization.

However, let us not seek to sell research in the behavioral sciences solely in terms of what it might contribute to our missiles and satellites programs. The survival of our society may well depend in even larger measure upon the success of our social and economic competition with Russia in the under-developed countries. Russia has increasing amounts of money and technicians to throw into the competition, but so far her efforts have not been based upon any empirical research knowledge of the functioning of communities and organizations.

Enough research has already been done so that we know some of the essential points involved in stimulating the process of economic development and social change. In a few cases scattered about the world, this knowledge has been effectively applied, with very impressive results. In most cases, administrators are still proceeding on a rule-of-thumb basis that is enormously costly and ineffective.

The long lead we have in this field of knowledge is not likely to be threatened for some time to come. Nevertheless, it seems doubtful whether our economic aid programs are applying more than five percent of what is already known. Let us do what we can to develop and utilize a resource that can be of crucial importance to our survival.

On Basic and Applied Research

Can applied research also be basic research? We would like to adopt as our own Chester I. Barnard's answer to this question. He gave it in the *Scientific American* (Nov. 1957) in commenting upon a report of the National Science Foundation, which sought to distinguish between two types of research.

... (As one) example, we have Karl Jansky's discovery of radio signals from outer space. Jansky, according to the report, was not engaged in basic research; he merely made a basic discovery. Here the confusion arises from labeling research according to the motives for which it is carried on; there is an element of snobbery involved which ought not be encouraged. After all Louis Pasteur made his great contributions to the foundations of bacteriology in trying to find solutions for the practical problems of the French silk and wine industries. The whole discussion demonstrates that the dichotomy between basic and applied research can be over-emphasized. The authors of the report are anxious to have it recognized that basic research carried on for no practical purpose involves results of great usefulness. No one will disagree, but the suggestion that basic research must have no practical motive or immediate application creates a dilemma which is going to plague the National Science Foundation more and more. The full story would require display of the interdependence between basic and applied research and would not minimize the fact that the traffic in inspiration, ideas and technique moves in both directions.